

CSIR NEWS

A SEMI-MONTHLY HOUSE BULLETIN OF CSIR

VOL 31 NO 16 30 AUGUST 1981

CSIR Helps Burma to Set up Pilot Plants for Calcium Carbide and Terpeneol

are furnace (380 kVA) for for the production of calcium carbide has been commissioned by scientists from the Central Electrochemical Research Institute (CECRI), Karaikudi, at the Central Research Organisation, Rangoon. The project was taken up by CECRI on behalf of the National Research Development Corporation of India (NRDC), which is setting up a number of pilot projects in Burma under Indian Technical and Economic cooperation programme to help Burma.

The CECRI scientists, Shri R. Chakrishnan and Shri M. Sundaram, demonstrated, during their stay at

CRO from 18 April to 20 June 1981, three trial runs, using indigenous limestone, burnt lime, charcoal and petroleum coke, in which about 200 kg of calcium carbide were produced.

The CECRI's assignment included a large number of tasks in the commissioning of the plant, such as putting up a plant at CECRI, transshipment of the plant and accessories to Burma, re-erection at CRO, and training of Burmese engineers from CRO's Metallurgy Research Department in the operation of the plant.

Terpeneol Plant

Another CSIR constituent, Mechanical Engineering Research & Development Organisation (MERADO), Pune, assisted CRO in the erection and installation of a pilot plant for the production of terpeneol. Shri A.K. Dey of MERADO was deputed to CRO from 16 May to 13 June 1981 on this assignment. This project also was executed under ITEC programme by NRDC.

The plant is based on the technology developed by the National Chemical Laboratory, Pune. MERADO designed the plant. □

Walnut Bleaching Technology Demonstrated

The working of the walnut bleaching unit developed by the Regional Research Laboratory (RRL), Jammu, was demonstrated at a function held at RRL Branch Laboratory, Srinagar, on 3 July 1981. Organized by the Research

Centre for Cellular & Molecular Biology

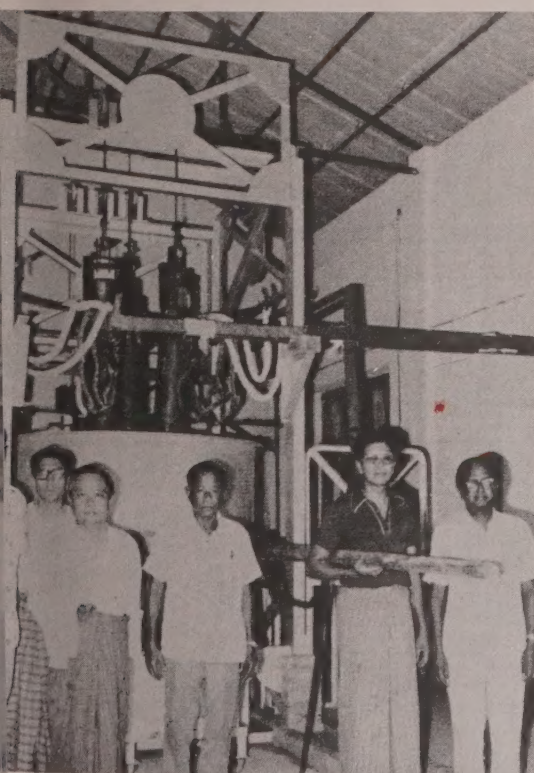
The Centre for Cellular & Molecular Biology till now functioning as a part of the Regional Research Laboratory, Hyderabad, is now an independent laboratory of CSIR.

Design and Development Committee of Jammu & Kashmir State, the function was attended by representatives of walnut industry and concerned government departments. Shri A.R. Shaheen, Jammu & Kashmir's Deputy Minister for Industry and Information, inaugurated the function.

Out of 18,000 tonnes of walnuts produced by J&K State, 13,000-14,000 tonnes are exported as in-shell or shelled nuts, fetching a foreign exchange of about Rs 80 million. The dehulled nuts obtained from producers have an unattractive appearance and frequently develop blemishes termed as 'hull mark' or 'hull strain'. The quality requirement of export-worthy walnuts is very rigid: the nuts should be clean, well bleached, and possess an attractive bright shell appearance. A number of processing units in the state are engaged in bleaching in-shell nuts, but the process

Inside

| | |
|---|---------|
| Mini Computer at INSDOC | ... 114 |
| Analytical Instruments: Symposium | ... 115 |
| Aluminium Anodizing using ac | ... 118 |
| Magnesium Fluogermanate Red Phosphor | ... 119 |
| Dr V. Jagannathan Retires | ... 119 |



Calcium carbide pilot plant commissioned at Rangoon. The CECRI scientists Shri R. Chakrishnan (extreme left) and Shri M. Sundaram (extreme right) are seen along with their CRO counterparts.

in vogue is ineffective and cumbersome. During treatment some water enters through crevices, making the kernels prone to fungus attack.

The process developed by RRL, Jammu, which is superior to the traditional process, consists in the treatment of nuts with a solution in a mechanically tilting enclosure which effects surface abrasion due to fast agitation. During a short reaction time of 3-5 min only the adhering resinous material is loosened and separated from the shell with simultaneous surface bleaching as a result of chemical action.

Computer Terminal Installed at INSDOC

In collaboration with the National Informatics Centre (NIC), INSDOC, New Delhi, has installed a HP (Hewlett Packard)-1000 (model 20) computing system at INSDOC-PID premises.

The installation of the computer terminal is in pursuance of the plan to link the CDC Cyber 170/720 located at NIC, Pushpa Bhawan, New Delhi. This is a general-purpose mainframe computing system, which can be used for networks of interactive and remote terminals as a central computer. The system has the capability to support 20 video terminals and 10 hard-copy terminals. The software and communication facilities associated with CDC Cyber 170/720 make it one of the most versatile computing systems available in India. Its special features

A processing unit with a capacity to handle 2.5 cwt material per batch and 10 tonnes per day has been fabricated at a cost of Rs 25,000. The cost of bleaching works out to Rs 12/cwt.

In order to test the technical viability of the process, walnut traders had brought 600 kg of walnuts of different colour defects to be treated during the demonstration. Following successful runs, the processing unit was purchased by a walnut trader.

The demonstration also served to indicate that a large number of traders are interested in buying the unit. □

Bulk storage:

Peripherals:

Software:

Word length, code used:

Floppy disc (514 kbytes)
Magnetic tape (800 bpi)
Magnetic cassette (1 kbytes)
1 card reader, 1 line printer, 1 CRT display, disc drive, 2 tape drive and 2 mini cassette tape drives
Assembler and editor
FORTRAN, BASIC compilers
Real Time Executive [RTE-M(ii)] with multi programming capability
16 bits using 2 character per word with ASCII 7-bit code

such as X-Edit, IMF (Information Management Facility) and TEXTJAB make the system useful for input/output oriented word-processing applications.

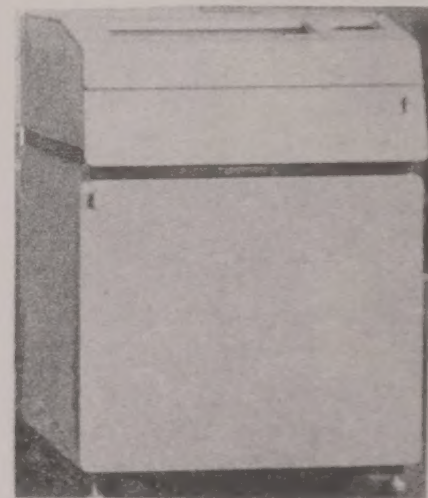
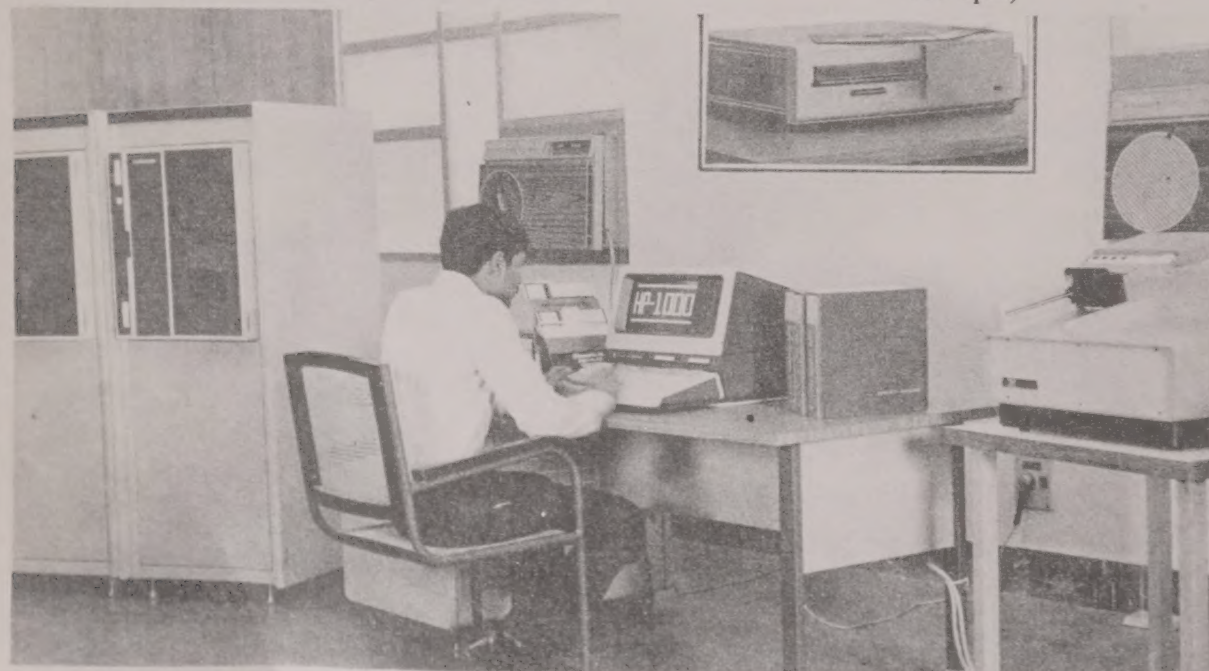
The system installed at INSDOC is a mini computer, which could be used as a 'stand alone' system apart from being used as a terminal to CDC Cyber 170/720.

The main features of the HP-1000 'Stand Alone' system are:

| | |
|----------------------------------|---|
| Memory size: | 64 kbytes |
| Memory type and characteristics: | Semiconductor memory which does not destroy the contents with a read instruction and fast access time |
| Input/output: | Teletype (VDU) Card reader (600 lpm) Printer (line printer with 300 lpm) |

The Real Time Executive operating system manages the computer system resources—the computer, main memory, disc storage memory and I/O devices—so efficiently that multiple users can perform different tasks at the same time. It also allows concurrent batch-processing. Additionally, RTE can respond to rapidly changing conditions. For example, it checks an internal priority list every 1/100th of a second to see what should be done next, and can react to an external 'interrupt' with 1/10,000th of a second.

Under the agreement between NIC and INSDOC, the HP-1000 system is available to all the CSIR constituents housed in the Pusa Complex. A committee will be constituted at INSDOC to coordinate the requirements of the user group. Requests for utilization of the facility may be



Hewlett Packard-100 mini computer installed at INSDOC-PID Campus. Main components seen are magnetic tape drives (*extreme left*), video display unit, card reader, floppy disc (*inset*), and line printer (*top*)

102 OCT 1981
C.F.T.R.I., MYSORE

pressed to the Scientist in charge, SDOC, New Delhi 110012. □

Symposium on Analytical Instruments

More than 120 analytical instrument technologists reviewed the state of art of technology and projected the future needs of the industry in the country at a national symposium held at the Central Food Technological Research Institute (CFTRI), Mysore, from 23 to 25 July 1981. Organized by the Instrument Society of India, the symposium was sponsored, among others, by the Central Scientific Instruments Organisation, Chandigarh, the National Physical Laboratory, New Delhi, and the Indian Institute of Chemical Biology, Calcutta.

Inaugurating the symposium, Prof. S. Hegde, University of Mysore's Vice Chancellor, said that instrumentation is a very strong base for the scientific and technological progress of a nation. Stating that we do not have an adequate backup for the maintenance and servicing of instruments and systems and that as a result a great deal of expensive equipment in industries and educational and research institutions often remain unproductive, Prof. Hegde called for improvement and expansion of the infrastructure in the field of instruments and measurements. Presiding over the function, Shri U. Shankateswaralu, President, Instrument Society of India, stated that medium-scale instrument technology had made rapid advances over the past one decade, but so far as analytical instruments were concerned, not much headway had been made. He wanted greater attention to be paid to the improvement of reliability and quality of instruments.

A panel discussed such aspects as training, facilities for maintenance of instruments, standardization and calibration, components—quality control and availability, as well as the mechanism for quality assurance.

Considering the immense utility of analytical instruments in various areas

of production, manufacture, testing and process control, the symposium stressed the need for servicing and preventive maintenance to achieve the required standards of operational efficiency.

Two of the recommendations were addressed in particular to the Instrument Society of India. The Society was urged (i) to organize topical theme workshops on specific instruments in different parts of the country, involving the participation of users, manufacturers and service personnel; and (ii) to act as an information dissemination centre in the instrumentation field.

The panel discussion also revealed the need to simplify the procedures for import of spare parts and components and also to improve the procedures of handling scientific equipment at various points of import to avoid damage and delay.

Recognizing the importance of servicing and maintenance in the operation of instruments, the symposium called for creation of adequate facilities where they are still needed; it also stressed that the service and salary conditions of maintenance staff should be commensurate with their responsibilities.

To meet the future needs of instrumentation in the country, the symposium called for promotion of long-term development projects following interaction of manufacturers and R&D workers through get-togethers.

An exhibition of analytical instruments, in which several manufacturers displayed their products, was also held. □

Isolation and Transformation of Naturally Occurring Terpenes

Conversion of (+)-car-3-ene, obtained from *Pinus longifolia*, into *cis*-chrysanthemic acid analogues possessing the desired 1*R*-configuration and useful in the synthesis of active insecticidal esters of the synthetic pyrethroids group has been studied. The studies were made by Shri B.M. Mane, a

teacher-fellow from Fergusson College, who worked under the guidance of Dr G.H. Kulkarni at the National Chemical Laboratory, Pune.

Three types of cyclopropane carboxylic acids were synthesized from (+)-car-3-ene: (a) methyl (+)-*cis*-chrysanthemate (I); (b) methyl 1*S*-*cis*- and methyl 1*R*-*trans*-2, 2-dimethyl-3-(2, 2-diphenylvinyl)cyclopropane-carboxylates (II) and (III); and (c) methyl 1*R*-*cis*-2, 2-dimethyl-3-(2-phenylprop-1-enyl)cyclopropane-carboxylate (IV), and methyl 1*S*-2, 2-dimethyl-3-(2-chloro-2-phenylvinyl)cyclopropane-carboxylate (V).

The keto-ester, methyl 3-(2-oxopropyl)-2, 2-dimethyl-*cis*-cyclopropane-1-acetate, obtainable from (+)-car-3-ene by a known procedure, was converted into its ethylene ketal and subjected to Grignard reaction using phenylmagnesium bromide to afford an alcohol, which on dehydration and deketalization gave the unsaturated ketone 2, 2-dimethyl-1-(2, 2-diphenylvinyl)-*cis*-3-(2-oxopropyl)cyclopropane. The latter was reacted with methylmagnesium iodide; the resulting alcohol on ozonolysis followed by oxidative workup gave (+)-dihydrochrysanthemolactone and 1*R*-*cis*-2, 2-dimethyl-3-(2-methyl-2-hydroxypropyl)cyclopropane-1-carboxylic acid. The latter on esterification and dehydration gave methyl (+)-*cis*-chrysanthemate.

The compounds II-V were obtained through well-known procedures.

Some interesting transformations of car-3-ene and saussurealactone were also studied. Car-3-ene was converted into car-3-(10)-ene-4-acetate and bicyclo[3.1.0]cyclohexane derivatives. Epoxidation of car-3-(10)-ene derivative afforded α -epoxide, which, on treatment with reagents such as alkali, acid and ZnCl_2 , furnished a variety of new products.

Selenium dioxide oxidation of saussurealactone, a thermal rearrangement product of dihydrocostunolide, gave, apart from the expected allylic oxidation products, a dialdehydolac-

tone possessing germacrenolide skeleton. The formation of this compound involves reversible Cope rearrangement of one of the allylic oxidation products obtained in the same reaction.

Some of the constituents of *Artemisia brevifolia* (Compositae) were isolated and characterized. These included artabsin, cycloart-23-ene-3, 25-diol, and ϵ -sitosterol.

Shri Mane was awarded Ph.D. degree by the University of Poona for his thesis based on the studies. □

Thermodynamics of Binary Non-electrolyte Mixtures

Excess volumes, free energy, enthalpy and entropy of mixing of binary mixtures of isomeric butanols with *n*-heptane have been studied by Shri Anil Kumar, a research fellow, who worked at the National Chemical Laboratory (NCL), Pune. The studies, carried out under the guidance of Dr S.S. Katti of NCL's Physical Chemistry Division, are helpful in understanding the intermolecular interaction of various butanols with *n*-heptane as also the effect of alkyl chain on the breaking of hydrogen bonds on addition of *n*-heptane.

The excess volumes were calculated by measuring the densities of mixtures at 25°C using Lipman's pycnometer. The free energy of mixing was calculated from the data obtained by a study of isothermal vapour-liquid equilibria at 55°, 65° and 75°C using a modified Jones Calburn still. A twin-type calorimeter was used for measuring excess enthalpy at 55°C.

Various data collected were explained on the basis of Brown's model of idealized concept. The excess volumes were found to be positive throughout the concentration range because of the breaking of hydrogen bonds and the presence of methyl substituents. The excess volumes and partial molar volumes were found to vary in the order: *tert*-butanol > *sec*-butanol > iso-butanol > *n*-butanol.

The excess free energy was found to be positive throughout the con-

centration range of study. The free energy of mixing was found to decrease from *n*-butanol to *tert*-butanol. This has been explained as due to hydroxyl group contribution. Excess free energy decreased with increase in temperature; however, there was no appreciable effect in the *tert*-butanol system.

The enthalpy of mixing was highly positive, which might be due to the breaking of self-associated butanol species.

The $H^E/x_1, x_2$ vs x_1 plots exhibited the trend *tert*-butanol > *sec*-butanol > iso-butanol > *n*-butanol at $x_1 = 0$, and the reverse trend at $x_2 = 0$. A maximum in H^E values was shown by *sec*-butanol, which was probably due to the presence of one asymmetric carbon atom.

The various excess properties were fitted into a series of Redlich Kister type equations.

The excess entropy was found to be positive except in the case of *n*-butanol; the S^E value was positive in this case up to 0.4 mole fraction. This was due to the breaking of hydrogen bonds in the dilute region.

The enthalpy of mixing was calculated at various temperatures by making use of Gibbs-Helmholtz equation. A good agreement was noted for iso-butanol and *sec*-butanol.

Shri Kumar was awarded Ph.D. degree by the University of Poona for his thesis based on the studies. □

Sorption and Thermal Properties of Synthetic Zeolites

Zeolites Y, from faujasite group, having most open and rigid framework with marked thermal stability, are widely used as catalysts for a variety of industrial reactions. Shri V.P. Shiralkar of the Physical Chemistry Division of the National Chemical Laboratory (NCL), Pune, has studied the sorption and thermal properties of a series La^{3+} exchanged zeolites and zeolites with a high degree of exchange with NH_4^+ and Ca^{2+} , and further modification with La^{3+} exchange.

The relative uptake of polar and non-polar sorbate molecules in a wide range

of cation exchanged Y type zeolites were measured and modifications in the zeolite cavity from the location distribution and accessibility of the cations evaluated from the data. The analysis of X-ray, IR, DTA and TC data was helpful in evaluating the lattice distortion with a marginal loss in crystallinity but a marked increase in thermal stability of the exchanged zeolites. The decreases in nitrogen sorption capacity, surface area and void volume were correlated with lattice distortion in La^{3+} and Ca^{2+} exchanged zeolites.

The evaluation of various thermodynamic parameters from CO_2 sorption proved the preferential occupancy of La^{3+} cations in the sites inaccessible to CO_2 and showed cation-specificity of CO_2 sorption. The CO_2 sorption data confirmed the applicability of the ideal models of the Langmuir and Volmer over a wide range of coverage, while those models failed to correlate satisfactorily NH_3 sorption data. Evaluation of isosteric heats and sorption affinities of both CO_2 and NH_3 sorption indicated that the quadrupole moment of CO_2 and dipole moment of NH_3 contributed nearly to the same extent towards sorption energetics. The exchanged zeolites provided energetically heterogeneous surface for the sorption of CO_2 and NH_3 , and differential molar entropies revealed that sorbed ammonia experienced more freedom in zeolite lattice as compared to CO_2 sorption.

Shri Shiralkar has also examined the applicability of various isotherm equations to the sorption data. Sips equation gave the extent of deviation from Langmuir equation while Koble-Corrigan equation was useful in evaluating the number of sorption centres. From the amount of NH_3 retained the relative acidity of these zeolites could be determined; zeolites exchanged with NH_4^+ were more acidic.

Shri Shiralkar, who carried out the work under the guidance of Dr (Kum) S.B. Kulkarni of NCL, was awarded the Ph.D. degree of the Poona University for his thesis based on the studies. □

Conference Briefs

Health Effects of Phthalate Plasticizers

P.K. Seth of the Industrial Toxicology Research Centre (ITRC), Lucknow, participated in a conference on Phthalate Plasticizers held in Washington, DC, USA, from 9 to 11 June 1981. Attending the conference on invitation from the US National Toxicology Programme (NTP), Dr Seth reports that the conference, jointly sponsored by NTP and Interagency Regulatory Liaison Group, reviewed the health effects of phthalate esters used as plasticizers in PVC plastics, and recommended among other things, careful toxicological evaluation of the phthalates and search for their substitutes.

The phthalate plasticizers have been reported to leach out from the PVC food bags and tubing, and to contaminate the blood and biological fluids stored or circulated through them. A recent report of their carcinogenic hazard, released by NTP, has aroused concern over their health effects.

About 300 participants including 45 speakers from various universities, regulatory agencies, and industry took part in the conference, observes Dr Seth. In one of the sessions, it was pointed out that currently available substitutes for phthalate plasticizers cannot replace them as the former are expensive and inferior in quality. The session stressed the need for careful toxicological evaluation of phthalates and search for their substitutes.

At another session, in which data on pharmacokinetics and general toxicology of phthalate plasticizers were presented, it was observed that phthalate esters are rapidly metabolized and excreted out with little or no accumulation in the body. Evidences were also presented to show that DEHP is handled differently by rodents and primates.

Briefly reviewing ITRC's work on hepatic effects of phthalate plasticizers,

Dr Seth observed that DEHP could (i) prolong the duration of action of sedative-hypnotic drugs (pentobarbitone, methaqualone); (ii) modify the biological actions of an organophosphorus pesticide (parathion); (iii) alter the toxicity of carbon tetrachloride; and (iv) affect the metabolism of ethanol. Recent data were also presented to show that such interactions between phthalates and other xenobiotics occur owing to the actions of the former on xenobiotic metabolizing enzymes.

The effect of phthalates on mitochondria, lipid metabolism and hepatic peroxisomal enzyme changes induced by the plasticizers and their relationship to carcinogenic potential of phthalates were described by other participants.

Phthalate esters were also shown to exert teratogenic, mutagenic and reproductive effects in mammals. Evidence was presented to show that phthalate esters produce severe gonadal toxicity and cause depletion of zinc from testis.

DEHP and butyl benzyl phthalate possess a carcinogenic potential in rodents, as revealed in another session.

A panel which discussed additional testing initiatives needed in view of the widespread use of phthalates and magnitude of human exposure recommended the following activities, in the same order of priority: (i) development of a battery of tests for genetic toxicity; (ii) work on male fertility and male germ mutations, teratology and post-natal development; and (iii) studies on mechanism of testicular zinc depletion and assay of tumour promotional activity.

Phthalate toxicity data generated in various research laboratories, the panel recommended, should be pooled at one place so that they could be supplied to industry and governmental agencies. □

Manpower Training in Toxic Chemicals Control

Participating in a meeting of the planning group on development of curricula for manpower training in control of toxic chemicals held at

Brussels, 15-19 June 1981, Dr C.R. Krishna Murti, Director, Industrial Toxicology Research Centre, Lucknow, outlined the lacunae in the existing facilities for manpower training in the light of the diverse tasks which a toxicologist is called upon to undertake in countries like India. The meeting, organized by the WHO European Regional Office, noted that in less developed countries there may be a reservoir of technical manpower which could be harnessed to build a cadre of trained toxicologists. It was recommended that WHO should sponsor meetings in less developed countries to discuss problems of manpower to deal with toxic chemicals. Dr Krishna Murti also explored the possibility of bringing India into the International Programme on Chemical Safety, jointly sponsored by WHO, ILO and UNEP. □

PROGRESS REPORTS

RRL-Trivandrum Annual Report: 1980

Twenty-two R&D projects spread over three principal divisions, viz. Materials (including glass & ceramics), Food (including spices), and Systems Planning and Research Management, were under investigation at the Regional Research Laboratory (RRL), Trivandrum, during 1980, according to its annual report published recently.

The report also shows that the Food Division of the laboratory has established itself as a major centre of research in the country in the area of plantation products like coconut, cashewnut and tapioca. Based on this laboratory's process for the manufacture of partially defatted coconut gratings suitable for use in chutney and confectionery, a factory was being set up in Kerala. The process for fractionation of chilli oleoresin into two fractions, viz. (i) a high-pungency fraction for use in pharmaceutical industry and (ii) natural colour fraction for use in the food processing industry, was bought by a party.

In one of the current projects, the laboratory is attempting to prepare oleoresins with fresh flavour from spices like ginger, pepper and chilli, in view of the culinary preference for spices with fresh flavour over dry spices.

The peppery top note and flavour of canned pepper could be improved by a drop or two of pepper oil added to the cans after filling and before sealing. Experimental trials were carried out to preserve fresh ginger and chilli both in the whole form and as slices in a mixture of brine and acetic acid with additives or by canning in sugar solution. Samples preserved in the laboratory were found acceptable. Studies on improving the storage stability of coconut oil were under way. Since consumption of tender coconut water results in suboptimal utilization of coconut, attempts are under way to upgrade mature coconut water, a waste product in the production of copra, to the level of tender coconut water and on preservation of the upgraded material. Attempts are being made to modify the texture of tapioca flour to that of wheat semolina.

Characterization of renewable and abundantly available resources like natural fibres, clay and sand, and development of new composite materials with industrial uses are the two major aims of the Materials Division. Laminates, helmets and casings were made from natural fibre-reinforced plastics. An experimental roofing, made with coir fibre mat and a phenolic resin, was under weathering tests. Work on copper coating of coir fibres was continued. A number of preservative coatings to prevent the decay of thatch roofs were being worked out; a mixture of cashew-nut shell liquid and coconut shell tar was found promising as a preservative coating. Treatment with a mixture of urea and ammonium phosphate was found to impart fire retardancy to thatch.

Aluminium-shell char, aluminium-zircon, and graphitic aluminium composite materials were successfully cast into water taps, piston bearings, and bushes. Al-11.8% Si coconut shell char

composites have superior wear resistance under adhesive wear conditions compared to the base alloys. Cu-TiO₂ and Cu-ZrO₂ composites were prepared on a laboratory scale by powder metallurgy techniques; their properties were under evaluation. Systematic evaluation of clays available in the Kerala region was continued; lightweight bricks and tiles were prepared in trials. Techniques of producing improved earthenware from fusible clays as also glazes for these wares were developed.

The laboratory is paying attention to the development of alternative sources of energy, especially utilization of solar energy for a variety of low- and high-temperature applications. A solar furnace to melt low-melting metals like zinc, lead and tin was designed and fabricated. A basket-type solar cooker for cooking tapioca was fabricated and its performance evaluated. A solar dryer for drying plantation products was under fabrication.

The laboratory published 27 research papers; its budget for 1980-81 was about Rs 58 lakh. □

Pepper & Pepper Products Bibliography

An annotated bibliography on Pepper and Pepper Products has been brought out by the Central Food Technological Research Institute (CFTRI), Mysore. The bibliography covers the R&D work done throughout the world on pepper and its products over 1970-80. Contains 350 titles, printed along with abstracts covering the entire gamut of pepper including variety and cultivation; production; marketing and trade; packaging, handling and storage; chemistry and analysis; processing; uses; quality aspects; standards; and patents.

The bibliography was issued on the occasion of the International Pepper Community meet and the workshop on Processing of Pepper and Pepper Products held at CFTRI in May [CN, 31 (1981), 97-98].

The publication (priced at Rs 50) may be obtained from the Director, Central Food Technological Research Institute, Mysore 570 013. □

PROCESSES AND PRODUCTS READY FOR COMMERCIAL UTILIZATION

Aluminium Anodizing using Alternating Current

Anodized aluminium pieces can be produced by employing alternating current as a result of a process developed by the Central Electrochemical Research Institute (CECRI), Karaikudi.

The processes currently in vogue for producing anodized articles employ direct current. In these processes rectifiers are employed for converting the ac power supply to dc. The CECRI process saves the additional investment to be borne on rectifiers. Moreover, the ac anodizing process makes possible the use of large currents, unlike in the dc

anodizing process; also, aluminium alloy pieces with high silicon and copper contents can be anodized without any difficulty.

The process sequence in ac anodizing is the same as that employed for dc anodizing.

Capital investment for a plant with a capacity for anodizing 18 m² of aluminium per day by the ac anodizing process has been estimated at Rs 1.94 lakh; the cost of production has been worked out to be Rs 23.50/m², the return on investment being 60%.

The process has been assigned to the National Research Development Corporation of India, New Delhi, from whom further details may be obtained. □

Magnesium Fluogermanate Red Phosphor

Central Electrochemical Research Institute, Karaikudi, has developed a process for the production of magnesium fluogermanate phosphor. Such phosphors are used in the manufacture of fluorescent tube lights emitting red colour.

The process consists in mixing magnesium oxide, germanium dioxide, ammonium fluoride, manganese nitrate and manganese chloride and later drying and heating the mixture in a silica crucible to 1100-1300°C. The heated product is air-quenched, ground, reheated to 1100-1300°C, and air-quenched again, ground to fine powder, and sieved to obtain a product of desired particle size.

The estimated annual demand for the phosphor is 3 tonnes.

Capital investment for a plant of 3 tonnes/annum capacity has been estimated at Rs 10.45 lakh, and the cost of production has been worked out to be Rs 590/kg, the return on investment being 60%.

The process has been assigned to the National Research Development Corporation of India from whom further details may be obtained. □

PERSONNEL NEWS

Appointments/Promotions

Dr S.K. Date

S.K. Date has been appointed Scientist EI in the Physical Chemistry Division of the National Chemical Laboratory, Pune (27 May 1981).

Dr Date (born 30 Nov. 1942) has had a brilliant academic career during which he was recipient of a number of merit scholarships. He obtained his Ph.D. from the Bombay University in 1969 following B.Sc. (1962) and M.Sc. (1964) degrees. A recipient of the visiting fellowship at the Tata Institute of Fundamental Research (TIFR), Bombay, during 1969-71, he subsequently joined TIFR's chemical physics group in 1971. He has held

postdoctoral assignments as Alexander von Humboldt Foundation Fellow, University of Saar, Saarbrücken, West Germany; Visiting Scientist, University of Saar; and Senior Alexander von Humboldt Fellow, Johannes Gutenberg Universität, Mainz, and University of Saar.

Besides specializing in inorganic and bioinorganic solid state materials, Dr Date has acquired expertise in modern physicochemical techniques. At TIFR he was assigned a major responsibility of making available various computer programmes to universities, national laboratories, etc.

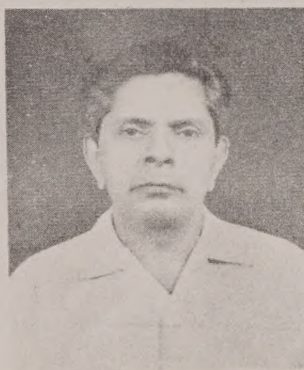
A life-member of the Indian Physics Association, Dr Date has more than 60 research publications to his credit. □

* * *

Dr V. Shankar has been appointed Scientist B in the Biochemistry Division of NCL, Pune (15 June 1981). □

Dr Jagannathan of NCL Retires

Dr V. Jagannathan, head of the Biochemistry Division of the National Chemical Laboratory, Pune, retired on 30 June 1981 after a distinguished career.



Joining NCL as Senior Scientific Officer in 1951, Dr Jagannathan rose to the position of Scientist in Director's grade.

A leading biochemist in the country, Dr Jagannathan has specialized in enzymology and plant tissue culture. He and his colleagues at NCL had reported the discovery of new enzymes such as NADP-specific glycerol dehydrogenase from *Aspergillus niger*, succinyl-CoA (-)-citramalate CoA transferase and (-)-citramalyl-CoA lyase of a

Pseudomonad, a specific plant acyl phosphatase, and a calcium-requiring phytase specific for phytate from *Bacillus subtilis*. In addition, the hydrogenase from *Desulfovibrio desulfuricans*, and hexokinase and acetyl cholinesterase from ox brain had been obtained in soluble form for the first time and a metallo-aldolase from *A. niger*, a NADase from ox brain and a sulfurylase of *D. desulfuricans* had been characterized. Dr Jagannathan's school have also characterized several new specific papain and subtilisin inhibitors of plants and plant callus cultures. They have made significant contributions in the bioconversion of cellulose both to microbial biomass product and to glucose.

In plant tissue culture also, Dr Jagannathan has established an active school of research at NCL to which goes the credit of the first reports on clonal propagation of mature forest trees. He has developed tissue culture methods for rapid propagation of economically important plants such as turmeric, ginger, cardamom, groundnut, sugarcane, and of elite forest and fruit trees such as teak, eucalyptus, tamarind, and pomegranate. Another breakthrough achieved by his group is the isolation by tissue culture methods of the widely grown sugarcane variety CO-740 plant free of mosaic virus. The elimination of the virus infection, which is manifest invariably in the particular variety of cane, was achieved for the first time and initial field trials at various locations indicated as much as 25% enhanced yields compared to the infected plants. He has also initiated, with promising results, mutation researches for obtaining high-yielding wheat and mosaic virus-resistant sugarcane plants. In a collaborative research with the Agricultural College, Pune, embryo culture techniques were used for successfully obtaining first-generation plants from crosses between a virus-resistant, wild, inedible papaya and the cultivated variety for the development of a virus-resistant edible variety. The group is also engaged in research on the

cloning of plant cells and somatic hybridization.

Dr Jagannathan is a fellow of the Indian National Science Academy and of the Indian Academy of Sciences and is a recipient of the prestigious Vividhlaxi Audyogik Samshodhan Vikas Kendra (VASVIK) award (1978) for his outstanding contributions in biological sciences and technology. He is founder-member of the Guha Research Conference, the Maharashtra Academy of Science, and the Plant Tissue Culture Association of India.

A symposium on 'Biochemistry and Plant Tissue Culture' was organized by NCL on the eve of his retirement.

Dr L.K. Doraiswamy, NCL's Director, presented Dr Jagannathan with the first-released volume of the NCL monograph series 1 on Plant Tissue Culture at a formal gathering of the staff.

In recognition of his outstanding contributions in plant tissue culture, Dr Jagannathan has been appointed a full-time consultant at NCL. □

Honours and Awards

Dr V.G. Bhide of the National Physical Laboratory, New Delhi, has been elected a director of the International Solar Energy Society. A pioneering worker in solar energy utilization, Dr Bhide was chairman of the committee appointed by the National Committee on Science and Technology (NCST) to review the status of solar energy research in India and in the world and advise NCST on organizing research in this area. A comprehensive report 'Solar energy: hope and challenge' submitted by him has been the basis of developmental work in this area.

Dr Bhide is also the chairman of the Asian working group on Solar Energy. He was vice chairman of the expert group convened by UNIDO, member of the expert group convened by WMO, and a member of the advisory board of the UN University in this area. □

Dr C.K. Atal, Director, Regional Research Laboratory, Jammu, has been designated a member of the task force

for the study of Ecodevelopment in Himalayan Region, by the Planning Commission.

Dr Atal has also been made a member of working group on Ethnobiology by the Department of Science and Technology. □

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

ADVERTISEMENT NO. 27/81

The Council proposes to appoint a Director for the Central Electrochemical Research Institute, Karaikudi (Tamil Nadu). This is a major institute for research and development in electrochemical sciences and technology, and electrochemical engineering. The main areas of work of the institute are: Electro-organic and Electro-inorganic products; Electrothermics and Electro-metallurgy; Electro-deposition and metal finishing; Batteries; Corrosion and its prevention; and Solid state electrochemistry. Work in other emerging/frontier areas can be started.

The prospective Director should have high academic qualifications in any branch of chemical science/technology or engineering, preferably in the electrochemical science and technology, with a proven record of research commanding confidence of the research and industrial community with ability to conduct, guide, correlate and sell research results. Experience in industry besides industrial R&D experience will be an added advantage. He will be required to provide leadership in the formulation of R&D programmes and projects and in organising and coordinating team work and commercial utilization of the results of research.

The post carries a scale of Rs 2500-125/2-3000 plus allowances as per Central Government rules. Higher initial pay may also be given. Subsidized housing is available in the campus. This is a contractual appointment for six years with a two-year period of probation. The contract is renewable and the incumbent can also be confirmed in the post. Age should preferably be below 50 years, relaxable in deserving cases.

Those interested may kindly send their *curriculum vitae* in the standard proforma, to be obtained from the office, on or before 15 September 1981 to Chief (Administration), Council of Scientific & Industrial Research, Rafi Marg, New Delhi 110001, who will also provide on request the annual report and brochure setting out the aims and objectives of CECRI. □

ADVERTISEMENT NO. 29/81.

The Council proposes to appoint a Director for its Centre for Study of Science, Technology and Development at New Delhi. As the head of the centre, the Director will be responsible for its management and guiding its programme of activities. Some of the major thrust areas of the

centre are (i) Historical and sociological studies in science; (ii) Science policy and planning of science & technology; (iii) Dynamics of science, technology and society; (iv) Forecasting and estimating scientific and technical manpower; (v) Assessment of technologies and working out alternatives for development.

Qualification & Experience: High academic qualifications in any branch of science/technology and high standing in the scientific community with an established reputation in research in one or more areas of thrust mentioned above. Experience in a scientific organization in senior positions for 15 years in related areas. **Scale of Pay:** The scale of pay attached to the post is Rs 2500-125/2-3000 plus allowances at Central Government rates; higher initial salary may be considered.

Age should be preferably below 50 years, relaxable in deserving cases.

Those interested may kindly send their *curriculum vitae*, in the form to be obtained from the office of the Council, to the Chief (Administration), Council of Scientific & Industrial Research, Rafi Marg, New Delhi 110001, on or before 15 September 1981.

ADVERTISEMENT NO. 30/81

The Council proposes to appoint a Director for the National Institute of Oceanography, Dona Paula (Goa). This is a premier institute for oceanographic research in the country. The main areas of work are: research and development relating to physical, chemical, geological, geophysical, biological and engineering aspects of oceanography; marine instrumentation; energy from sea; international collaboration in ocean research programmes and integration of various activities within the country relating to exploration and exploitation of the seas around India. The prospective Director should be a scientist of high repute with high academic qualifications and scientific standing in a branch of oceanography. He should also have experience of guiding, planning and directing research programmes in one or more fields of oceanography and should possess high managerial abilities.

The salary scale attached to the post is Rs 2500-125/2-3000 plus allowances at Central Government rates. Higher initial pay can also be given. Subsidized housing is available in the campus. This is a contractual appointment initially for a period of 6 years. The contract is renewable and incumbent can also be confirmed in the post.

Age limit is 50 years, which may be relaxed.

Those interested may send their *curriculum vitae* on or before 30 September 1981 to the Chief (Administration), Council of Scientific & Industrial Research, Rafi Marg, New Delhi 110001, who will also provide on request the annual report and a brochure setting out the aims and objectives of NIO.